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PTO/SB/05 (2/98)

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UTILITY
PATENT APPLICATION
TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR § 1.53(b))

Attorney Docket No. 7000-043

First Inventor or Application Identifier Wood, Patrick

Title PROGRAMMABLE FEATURE QUEUES

Express Mail Label No. EL555717001US

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

ADDRESS TO:

Commissioner for Patents
Box Patent Application
Washington, DC 20231

1. ☒ *Fee Transmittal Form (e.g., PTO/SB/17)
(Submit an original and a duplicate for fee processing)
2. ☒ Specification [Total Pages 34]
(preferred arrangement set forth below)
 - Descriptive title to the Invention
 - Cross References to Related Applications
 - Statement Regarding Fed sponsored R & D
 - Reference to Microfiche Appendix
 - Background of the Invention
 - Brief Summary of the Invention
 - Brief Description of the Drawings (if filed)
 - Detailed Description
 - Claim(s)
 - Abstract of the Disclosure
3. ☒ Drawing(s) (35 U.S.C. 113) [Total Sheets 3 sets of 6]
4. ☒ Oath or Declaration [Total Pages 2]
 - a. ☒ Newly executed (original or copy)
 - b. ☐ Copy from a prior application (37 C.F.R. § 1.63(d))
(for continuation/divisional with Box 17 completed)
[Note Box 5 below]
 - i. ☐ DELETION OF INVENTOR(S)
Signed statement attached deleting
inventor(s) named in the prior application,
see 37 C.F.R. §§ 1.63(d)(2) and 1.33(b).
5. ☐ Incorporation By Reference (useable if Box 4b is checked)
The entire disclosure of the prior application, from which a
copy of the oath or declaration is supplied under Box 4b,
is considered as being part of the disclosure of the
accompanying application and is hereby incorporated by
reference therein.

6. ☐ Microfiche Computer Program (Appendix)
7. ☐ Nucleotide and/or Amino Acid Sequence Submission
(if applicable, all necessary)
 - a. ☐ Computer Readable Copy
 - b. ☐ Paper Copy (identical to computer copy)
 - c. ☐ Statement verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

8. ☒ Assignment Papers (cover sheet & document(s))
9. ☒ 37 C.F.R. § 3.73(b) Statement ☒ Power of Attorney
(when there is an assignee)
10. ☐ English Translation Document (if applicable)
11. ☒ Information Disclosure ☒ Copies of IDS
Statement (IDS)/PTO-1449 Citations
12. ☐ Preliminary Amendment
13. ☒ Return Receipt Postcard (MPEP 503)
(Should be specifically itemized)
14. ☐ *Small Entity ☐ Statement filed in prior application,
Statement(s) Status still proper and desired
15. ☐ Certified Copy of Priority Document(s)
(if foreign priority is claimed)
16. ☐ Other: _____

*NOTE FOR ITEMS 1 & 14: IN ORDER TO BE
ENTITLED TO PAY SMALL ENTITY FEES, A SMALL
ENTITY STATEMENT IS REQUIRED (37 C.F.R.
§ 1.27), EXCEPT IF ONE FILED IN A PRIOR
APPLICATION IS RELIED UPON (37 C.F.R. § 1.28).

17. If a CONTINUING APPLICATION, check appropriate box and supply the requisite information below and in a preliminary statement:

☐ Continuation ☐ Divisional☐ Continuation-in-part (CIP)

of prior application No: _____ / _____

Prior application information:

Examiner:

Group/Art Unit: _____

18. CORRESPONDENCE ADDRESS

☒ Customer Number or Bar Code Labelor ☐ Correspondence address below

NAME

24631

PATENT TRADEMARK OFFICE

ADDRESS

CITY

STATE

ZIP CODE

COUNTRY

TELEPHONE

FAX

Name (Print/Type)

Benjamin S. Withrow

Registration No. (Attorney/Agent)

40,876

Signature

Date

November 28, 2000

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Small Entity payments must be supported by a small entity statement.
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See 37 C.F.R. §§ 1.27 and 1.28.

Complete if Known

TOTAL AMOUNT OF PAYMENT		(\$)1672.00	
Application Number			
Filing Date		November 28, 2000	
First Named Inventor		Wood, Patrick	
Examiner Name			
Group/Art Unit			
Attorney Docket No.		7000-043	

METHOD OF PAYMENT (check one)**FEE CALCULATION (continued)**

1. ☒ The Commission is hereby authorized to charge indicated fees and credit any over payments to:

Deposit Account Number: 18-1164

Deposit Account Name: Rhodes & Mason, P.L.L.C.

- ☒ Charge Any Additional Fee Required
Under 37 CFR §§1.16 and 1.17

2. ☒ Payment Enclosed.

☒ Check ☐ Money Order ☐ Other

FEE CALCULATION**1. BASIC FILING FEE**

Large Fee Code	Entity Fee (\$)	Small Fee Code	Entity Fee (\$)	Fee Description	Fee Paid
101	710	201	355	Utility filing fee	710.00
106	320	206	160	Design filing fee	
107	490	207	245	Plant filing fee	
108	710	208	355	Reissue filing fee	
114	150	214	75	Provisional filing fee	
SUBTOTAL (1)					(\$)710.00

2. EXTRA CLAIM FEES

	Extra Claims	Fee from below	Fee Paid
Total Claims	49	-20** = 29 X 18.00 =	522.00
Independent Claims	8	-3** = 5 X 80.00 =	400.00
Multiple Dependent Claims			

** or number previously paid, if greater; For Reissues, see below

Large Fee Code	Entity Fee (\$)	Small Fee Code	Entity Fee (\$)	Fee Description
103	18	203	9	Claims in excess of 20
102	80	202	40	Independent claims in excess of 3
104	270	204	135	Multiple dependent claim
109	80	209	40	**Reissue independent claims over original patent
110	18	210	9	**Reissue claims in excess of 20 and over original patent
SUBTOTAL (2)				(\$922.00)

3. ADDITIONAL FEES

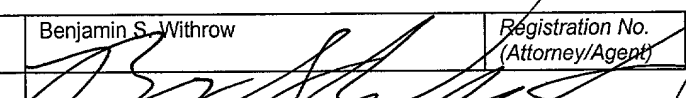
Large Fee Code	Entity Fee (\$)	Small Fee Code	Entity Fee (\$)	Fee Description	Fee Paid
105	130	205	65	Surcharge - late filing fee or oath	
127	50	227	25	Surcharge - late provisional filing fee or cover sheet	
139	130	139	130	Non-English specification	
147	2,520	147	2,520	For filing a request for reexamination	
112	920*	112	920*	Requesting publication of SIR prior to Examiner action	
113	1,840*	113	1,840*	Requesting publication of SIR after Examination action	
115	110	215	55	Extension for reply within first month	
116	390	216	195	Extension for reply within second month	
117	890	217	445	Extension for reply within third month	
118	1,390	218	695	Extension for reply within fourth month	
128	1,890	228	945	Extension for reply within fifth month	
119	310	219	155	Notice of Appeal	
120	310	220	155	Filing a brief in support of an appeal	
121	270	221	135	Request for oral hearing	
138	1,510	138	1,510	Petition to institute a public use proceeding	
140	110	240	55	Petition to revive - unavoidable	
141	1,240	241	620	Petition to revive - unintentional	
142	1,240	242	620	Utility issue fee (or reissue)	
143	440	243	220	Design issue fee	
144	600	244	300	Plant issue fee	
122	130	122	130	Petitions to the Commissioner	
123	50	123	50	Petitions related to provisional applications	
126	240	126	240	Submission of Information Disclosure Stmt	
581	40	581	40	Recording each patent assignment per property (times number of properties)	40.00
146	710	246	355	Filing a submission after final rejection (37 CFR §1.129(a))	
149	710	249	355	For each additional invention to be examined (37 CFR §1.129(b))	

Other fee (specify) _____

Other fee (specify) _____

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) (\$)40.00

SUBMITTED BY		Complete (if applicable)	
Name (Print/Type)	Benjamin S. Withrow	Registration No. (Attorney/Agent)	40,876
Signature		Telephone	(919) 657-0450
		Date	11/28/2000

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Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

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**UNITED STATES PATENT
APPLICATION
FOR GRANT OF LETTERS PATENT**

**Patrick S. Wood
INVENTOR**

**PROGRAMMABLE FEATURE
QUEUES**

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PROGRAMMABLE FEATURE QUEUESField of the Invention

5 The present invention generally relates to call processing, and in particular, relates to providing custom events and feature initiation sequences during call processing.

Background of the Invention

10 With the advent of intelligent networks, the number of calling features, such as "call waiting" and "call forward busy," have greatly increased. These features are triggered based on a defined event during a telephony call. Since multiple features may be available for a
15 given event, the order in which these features are initiated is defined in a feature queue. Thus, when the trigger event occurs, the entity providing call processing will attempt to initiate the features in the feature queue in a sequential fashion.

20 Typically, the events, features, and order of the features in the feature queues are set for an entire switching center, such as a central office or mobile switching center. In addition, both the telephony equipment manufacturers and the service providers are
25 typically constrained by the event and feature policies established by standards entities, such as Bellcore. At the present, these entities define the events that trigger features and the order in which these features are initiated for a given event. When customers of the
30 equipment manufacturers want to modify the event and feature policies dictated by the standards entity, the equipment manufacturer, customer, and standards entity must get together and negotiate any changes in the policies, because the equipment manufacturers cannot

unilaterally change the policies. Although the customers could theoretically change their individual event and feature policies, there is not way to facilitate the modification of events and features at a per-office level. As such, there is a need for a way to modify call processing events and feature initiation sequences on a per-office basis.

Further, many subscribers and groups of subscribers may not subscribe to the services associated with the call features. For example, many subscribers and groups thereof do not subscribe to call waiting and an even greater number typically do not subscribe to call forward busy services. Unfortunately, the rigid structure of the current call processing architecture attempts to initiate each of these features, even if the subscriber or group thereof does not subscribe to the service associated with the feature. Given the numerous events and potential features for each of these events, a significant amount of processing time and power is wasted attempting to initiate features that are not relevant to the given call. As such, there is a need for a way to eliminate unnecessary attempts to initiate call features that are not available for a subscriber, group of subscribers, or office.

A further failing of the existing call processing architecture is the inability to change the order of initiation of features for a given event. For example, if a subscriber or group of subscribers subscribe to call waiting and call forward busy services, many of the subscribers may want to have the call waiting service initiated prior to call forward busy whereas others would rather the call forward busy service initiate prior to call waiting. Similar decisions may be desired for an entire office. Regardless of whether it is the entire

office, a group or subscribers, or an individual subscriber, there is a need to provide an efficient way to select the order in which features are initiated for a given event in addition to defining features for a given event.

Summary of the Invention

The present invention provides for modification of call features and the priority to initiate these call features on an overall office, group, or subscriber level. In essence, configurable feature queues may be created and associated with any number of subscribers or groups of subscribers in a call processing environment. Preferably, a standard feature queue is provided for an office. The call features and the sequence in which the call features are implemented are modifiable within the standard feature queue for the entire office. Additional feature queues for identified groups of subscribers may be created and modified as desired to provide a unique feature queue for that particular group. Similarly, feature queues may be created and modified for individual subscribers. As such, the present invention provides for customized feature queues on a per-office, per-group, or per-subscriber level.

When creating unique feature queues for the various groups of subscribers and individual subscribers, the group subscriber may initially inherit the standard feature queue for the office and then modify the feature queue as desired. Similarly, an individual subscriber may inherit the standard feature queue for the office, and preferably, when in a defined group of subscribers, inherit the feature queue for the group. The feature queues may be associated with the entity providing call

processing or may be provided in a remote database accessible by the entity providing the call processing.

In operation, the call processing entity will receive a trigger indicating a call processing event has occurred. The entity will identify the associated feature queue for the subscriber, group, or office, and provide call processing according to the call features defined in the chosen feature queue. Preferably, a feature queue for the lowest level entity is chosen. For example, if a subscriber has a defined feature queue and the subscriber falls within a group of subscribers having a feature queue, the individual subscriber feature queue will take precedence over the group's feature queue. Similarly, a group's feature queue will take precedence over the standard office feature queue.

Call processing may take place in any number or combination of nodes in a variety of telephony networks. The call processing techniques of the present invention are equally applicable to traditional circuit-switched telephony systems, such as the public switched telephone network and wireless telephony networks. Further, the invention is beneficial in packet-switched telephony networks, such as those used to carry voice, or in asynchronous transfer mode-based network. The call processing activities may be provided by a central call processing unit or call server, or may be distributed or provided by virtually any entity, from the telephony endpoint to a centralized call processing node.

Those skilled in the art will appreciate the scope of the present invention and realize additional aspects thereof after reading the following detailed description of the preferred embodiments in association with the accompanying drawing figures.

Brief Description of the Drawing Figures

The accompanying drawing figures incorporated in and forming a part of the specification illustrate several aspects of the present invention, and together with the
5 description serve to explain the principles of the invention.

FIGURE 1 is a block representation of an intelligent network configured to facilitate one embodiment of the present invention.

10 FIGURE 2 is a flow diagram outlining the initial setup of events and associated features for an office, group of subscribers, and/or individual subscriber.

FIGURE 3 is a table outlining an exemplary event table having modified feature queues.

15 FIGURE 4 is a flow diagram outlining basic call processing using the modified event table and feature queues.

FIGURE 5 is a block representation of a service node.

20 FIGURE 6 is a block representation of a switching node.

Detailed Description of the Preferred Embodiments

The present invention provides for associating call
25 processing events, the features associated with those events, and the order in which those features are initiated, on a per-office, per-group, and/or per-subscriber basis. Upon reading the following description in light of the accompanying drawing figures, those
30 skilled in the art will understand the concepts of the invention and will recognize applications of these concepts not particularly addressed herein. It should be understood that these concepts and applications fall within the scope of this disclosure and the accompanying

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Traditionally, intelligent network components include a service switching point (SSP) 12, an intelligent peripheral (IP) 14 closely associated with the SSP 12, a signal transfer point (STP) 16 and a service control point (SCP) 18 that cooperate to facilitate the establishment of calls and conduct the call processing associated therewith. The intelligent network system 10 will also typically include a service creation environment (SCE) 20 and a service management system (SMS) 22 that cooperate to facilitate overall management, administration and maintenance of the intelligent network system 10.

The SSP 12 typically includes a hardware switch in association with software to facilitate basic call control and the added functionality to support intelligent network services and features. Preferably, the SSP 12 is configured to separate basic calls from intelligent network-based calls as they arrive at the

switch. The intelligent network-based calls are associated with events and features triggered upon the occurrence of these events. When handling an intelligent network-based call, the SSP 12 will temporarily suspend
5 basic call processing and interact with the SCP 18 via the STP 16 using Signaling System Number 7 (SS7) signaling protocol to determine how to process the call based on the identified event.

The SSP 12 may be a central office exchange, local
10 exchange, private branch exchange (PBX) or the like, capable of handling circuit-switched communications with any number of subscribers via telephony devices 24. To facilitate communications, the SSPs 12 carry voice
15 trunks 26 to facilitate the various connections between the telephony devices 24.

The STP 16 is typically a very reliable packet switch that provides for concentration of signaling for a large number of trunks 26 and handles the routing of
20 signaling messages between the SSPs 12 and SCPs 18. Further, the STP 16 may facilitate translation of a virtual destination to a physical destination as well as provide security screening. STPs 16 are not necessary
25 for intelligent network systems and may be co-resident in the SSP 12.

The SCP 18 facilitates call processing, and usually includes a real-time database that stores subscriber records. When accessed during an intelligent network-based call from the SSP 12, the SCP 18 executes logic for
30 call processing. In the present invention, the SCP 18 will typically receive a call processing inquiry from the SSP 12 upon the occurrence of an event during a call and send instructions back to the SSP 12 on how to process the call.

5 announcements, facilitating an interactive voice response capability, translating dual tone multi-frequency (DTMF) signals, recognizing speech, managing facsimiles, and providing access to additional signaling networks.

The SCE 20 typically provides an interface to the intelligent network system 10 and facilitates development, debugging and provisioning of new services for the intelligent network system 10. The SMS 22 provides for loading, administration, and maintenance of data and provides an interface to the SCP 18. This interface allows management to create, update, and validate number translation and call charge tables as well as download information from and control logic of the SCP 18.

As noted the SSP 12 is typically a switch that
operates to recognize service requests, request call
handling instructions from an SCP 18, and execute those
instructions to complete a call. The SSP 12 looks for
embedded "triggers" associated with events, which require
the SSP 12 to initiate an intelligent network service by
sending a query to the SCP 18. As described below, the
event triggering call processing by the SCP 18 is
typically associated with one or more features associated
with call services. The SSP 12 also formulates and
transmits requests to the SCP 18 and processes replies
and requests from the SCP 18. The SSP 12 creates
intelligent network announcements formulated by the
service provider, typically in association with the IP
14, and transmits event messages to the SCP 18.

10

30

Traditionally, the events triggering call features are static for a given office or exchange. In the case

of a busy condition, a static feature queue is provided whereupon the occurrence of a busy condition, call processing will automatically attempt to initiate the call waiting service, and if the call waiting service is not satisfied, attempt to initiate a call forward busy service. The latter service allows the call to be forwarded to another number defined by the called party.

For a traditional system, call processing is handled as follows. Assume for the purposes illustrated that a called party using telephony device 24M is busy on a call and that there is an incoming call to telephony device 24M from another telephony device 24A. The call between telephony device 24A and telephony device 24M extends from the telephony device 24A to the associated SSP 12, and is routed to the SSP 12 associated with the telephony device 24M and on to the telephony device 24M. When the local SSP 12 attempts to route the call to the telephony device 24M, the originating SSP 12 will detect that the telephony device 24M is busy on another call, which recognizes the busy condition event.

Upon recognition of the busy condition event, the SSP 12 queries the SCP 18 for call processing instructions, if applicable. If, for example no IN service was provisioned, no query would occur. The SCP 18 receives the query, typically in association with the destination telephone number (i.e. the telephone number for telephony device 24M), and accesses a database for call processing instructions in the event of a busy condition. Assuming the static feature queue for the busy condition event requires initiation of a call waiting service followed by the initiation of a call forward busy service, if the call waiting service is not accepted, call processing will be provided accordingly. For call waiting, the SCP 18 will instruct the switch to

provide the call waiting tone for a select number of times, and if the called party does not respond to the call waiting signal, the SSP 12 will again query the SCP 18 for additional call processing instructions. As such, the SCP 18 will send instructions to the SSP 12 to facilitate the call forward busy service as defined in the feature queue for the busy condition event.

Although the above example is fairly simplistic, those skilled in the art will recognize the static nature of feature processing upon the occurrence of events throughout call processing. As outlined in Figure 2, the present invention allows for modifying the traditional feature queues associated with an event, and optionally, allows individual subscribers or groups of subscribers to modify and define their own feature queues for events.

Although the preferred embodiment of the invention facilitates call processing in the SCP 18, the inventive call processing techniques provided by the present invention may be incorporated in virtually any node or point in a telephony system, including any telephony devices capable of handling call processing. Further, call processing may be shared amongst various points, as those skilled in the art will recognize.

Initially, a default set of events with associated feature queues are received (block 100) by the call processing system. This default set of events and feature queues may be governed by standards organization, such as Bellcore. With the present invention, modification of the events and the associated features may be modified on a per-office basis. As such, management of the office will define the events and the features provided by that office (block 110). Accordingly, a feature queue is created for each event (block 120). The feature queue defines the order to

initiate features upon occurrence of the event for the entire office.

The table in Figure 3 provides an exemplary call processing event and feature table identifying two events (EVENT 1 and EVENT 2). The default features in the feature queue for EVENT 1 include FEATURES 1 through 4, while the features in the feature queue for EVENT 2 are FEATURES 5 through 8. According to the default settings, upon the occurrence of EVENT 1, FEATURES 1 through 4 will be initiated in order, assuming FEATURES 1 through 3 are not successfully deployed in a fashion satisfying a response to the event. Similarly, FEATURES 5 through 8 are initiated in order upon the occurrence of EVENT 2. At this point, the present invention allows modification of the feature queue for each event for the entire office (Figure 2, block 120). Referring again to Figure 3, the feature queue associated with EVENT 1 for the office is modified such that FEATURE 4 is not provided, and the features will initiate in the following order: FEATURE 2, FEATURE 1, and FEATURE 3. The feature queue for EVENT 2 is depicted as remaining the same as the default for the office.

If desired, various groups within an office may be defined and associated with a custom feature queue. Further, custom features queues for individual subscribers may be provided. Depending on whether a group or individual subscriber queue is necessary, the members of the group or the individual subscriber is identified (Figure 2, block 130), and feature queues are established for the identified group or individual subscriber (block 140).

With reference to Figure 1, all of the subscribers for office A are either associated with group X or group Y. In contrast, subscribers G through L are associated

As shown in the table of Figure 3, the defined groups X, Y, and Z and subscribers M and N will preferably, automatically inherit the default feature queues of the associated group or office (Figure 2, block 150). As shown in Figure 3, one of the groups within the office may rearrange the order of features in the feature queue, which was previously modified by the office.

15 The group identified in the table of Figure 3 will
have a feature queue defining initiation of FEATURE 3,
FEATURE 2, and then FEATURE 1 upon the occurrence of
EVENT 1. Since the office does not support FEATURE 4 for
EVENT 1, the group will not support the feature or
20 provide the feature in the feature queue. For EVENT 2,
the features in the feature queue for the group have been
modified from that of the office wherein the features are
triggered in the following order: FEATURE 6, FEATURE 7,
FEATURE 8 and FEATURE 5.

25 Similarly, subscribers within the group may further
modify their feature queues (Figure 2, Block 160). For
the subscribers identified in Figure 3, the feature queue
for EVENT 1 carries out the features in the following
order: FEATURE 1, FEATURE 2 and FEATURE 3. The feature
30 queue for EVENT 2 for the identified subscriber provides
the following order: FEATURE 7, FEATURE 6, FEATURE 5 and
FEATURE 8 for EVENT 2.

Accordingly, events, features, and the order in which the features are listed in the feature queue may be

Variable	Mean	SD	Min	Max
Age	34.5	10.2	22	55
Gender	0.5	0.5	0	1
Marital status	0.6	0.5	0	1
Education	12.5	1.5	10	15
Income	1500	500	1000	2500
Health status	0.8	0.2	0	1
Stress level	3.5	1.5	1	5
Life satisfaction	4.2	1.0	3	5
Work-life balance	3.8	1.2	2	5
Family support	4.5	1.0	3	5
Community support	4.0	1.0	3	5
Healthcare access	4.8	0.8	4	5
Quality of life	4.5	0.8	4	5
Overall well-being	4.3	0.9	4	5

Variable	Mean	SD	Min	Max
Age	34.5	10.2	22	55
Gender	0.5	0.5	0	1
Marital status	0.6	0.5	0	1
Education	12.5	1.5	10	15
Income	1500	500	1000	2500
Health status	0.8	0.2	0	1
Stress level	3.5	1.5	1	5
Life satisfaction	4.2	1.0	3	5
Work-life balance	3.8	1.2	2	5
Family support	4.5	1.0	3	5
Community support	4.0	1.0	3	5
Healthcare access	4.8	0.8	4	5
Quality of life	4.5	0.8	4	5
Overall well-being	4.3	0.9	4	5

Variable	Mean	SD	Min	Max
Age	34.5	10.2	21	55
Gender	0.5	0.5	0	1
Marital status	0.6	0.5	0	1
Education	12.5	1.5	9	16
Income	1500	500	500	3000
Health status	0.8	0.2	0	1
Stress level	3.5	1.5	1	5
Life satisfaction	4.2	1.0	1	5
Work-life balance	3.8	1.2	1	5
Family support	4.5	1.0	1	5
Community support	4.0	1.0	1	5
Healthcare access	4.8	0.8	1	5
Quality of life	4.5	0.9	1	5
Overall well-being	4.3	0.8	1	5

Variable	Mean	SD	Min	Max
Age	34.5	10.2	21	55
Gender	0.5	0.5	0	1
Marital status	0.6	0.5	0	1
Education	12.5	1.5	9	16
Income	1500	500	500	3000
Health status	0.8	0.2	0	1
Stress level	3.5	1.5	1	5
Life satisfaction	4.2	1.0	1	5
Work-life balance	3.8	1.2	1	5
Family support	4.5	1.0	1	5
Community support	4.0	1.0	1	5
Healthcare access	4.8	0.8	1	5
Quality of life	4.5	0.9	1	5
Overall well-being	4.3	0.8	1	5

Variable	Mean	SD	Min	Max
Age	34.5	10.2	21	55
Gender	0.5	0.5	0	1
Marital status	0.6	0.5	0	1
Education	12.5	1.5	9	16
Income	1500	500	500	3000
Health status	0.8	0.2	0	1
Stress level	3.5	1.5	1	5
Life satisfaction	4.2	1.0	1	5
Work-life balance	3.8	1.2	1	5
Family support	4.5	1.0	1	5
Community support	4.0	1.0	1	5
Healthcare access	4.8	0.8	1	5
Quality of life	4.5	0.9	1	5
Overall well-being	4.3	0.8	1	5

Variable	Mean	SD	Min	Max
Age	34.5	10.2	21	55
Gender	0.5	0.5	0	1
Marital status	0.6	0.5	0	1
Education	12.5	1.5	9	16
Income	1500	500	500	3000
Health status	0.8	0.2	0	1
Stress level	3.5	1.5	1	5
Life satisfaction	4.2	1.0	1	5
Work-life balance	3.8	1.2	1	5
Family support	4.5	1.0	1	5
Community support	4.0	1.0	1	5
Healthcare access	4.8	0.8	1	5
Quality of life	4.5	0.9	1	5
Overall well-being	4.3	0.8	1	5

second, call processing will attempt to initiate call waiting, and if the call waiting initiation attempt fails, for whatever reason, a call forward busy attempt is initiated.

5 Once the call processing for the event is complete, the call processing system will determine if the next event trigger has been received (block 250). If the next event trigger is received, the process will preferably repeat by identifying the event (block 220), determining the lowest level entity associated with the feature queue (block 230), and enabling the features in the queue until the call processing is complete (block 240).

If the next event triggered is not received (block 250), the system will determine if the call is complete (block 260). If the call is not complete, the system will continue to monitor for the next event trigger (block 250). If the call is complete, processing will end (270).

Those skilled in the art will recognize that call processing capabilities may be incorporated in various ones of the points in the intelligent network 10, and may be shared between multiple points therein. Further, the present invention is equally applicable to various telephony systems providing call processing to facilitate call features. As the processing capabilities in telephony networks move closer to the endpoints; telephony switches, peripherals, and the telephony devices themselves may be configured to carry out call processing. In the latter case, the telephony device 24 will represent a point in the communication system capable of providing call processing.

A further modification of the present invention is to allow the features associated with an event to be determined from multiple queues. For example, in an

advanced intelligent network structure, an advanced intelligent network database 28 (Figure 1) may provide additional feature processing or identify additional features for an event. The features associated with the advanced intelligent network database 28 may be used instead of or combined with the call processing features associated with the database used by the SCP 18. In essence, the feature queue may include queues from multiple databases to identify features to initiate based on a given event.

The ability to associate feature queues for events with subscriber groups and individual subscribers is equally applicable to packet-switched telephony wherein features are associated with telephony calls facilitated over packet-switched networks, such as used in voice-over IP. Similarly, call processing for mobile or wireless communication systems may be equally controlled on a subscriber, group or office level.

Importantly, the databases storing the feature queues and associated events may be incorporated within the node providing the call processing, or may be remote therefrom. For example, the SSP 12 may provide a database accessible by the SCP 18 for storing feature codes for the various subscribers, groups, or the entire office. Although the processing and database allocation may be quite varied, it is preferably to place the database and the overall call processing in the SCP 18, or like call server for the communication system.

Outside of the switch or SSP 12, most of the call processing points in a communication server are configured to communicate over a packet-switched network and do not require the ability to actually transport voice traffic in a packet- or circuit-switched form. As such, a basic service node or point, as shown in Figure

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feature when the feature is in a feature queue, but not provisioned by the office or subscribed to by the group or subscriber. In essence, call processing time is not wasted trying to figure out that a feature in the default feature queue is not applicable. Call servers or like call processing systems may be provisioned according to standardized specifications while allowing customers the opportunity to modify policy provisions after the sale. Further, these policies may be further modified for various groups and subscribers supported within the overall system. Those skilled in the art will recognize further modifications and improvements of the present invention. All such modifications and improvements are considered within the teachings herein and the claims that follow.

Claims

What is claimed is:

1. A method facilitating customized call processing
5 comprising:
- a) providing a feature queue for each of a plurality of entities, each feature queue defining a sequence to initiate call features associated with an event for call processing;
 - 10 b) receiving a trigger indicating an occurrence of the event for a call associated with one of the plurality of entities;
 - c) identifying the feature queue associated with the one of the plurality of entities
15 corresponding to the event; and
 - d) processing the call to implement the call features in the sequence defined in the feature queue for the call.
- 20 2. The method of claim 1 wherein each of the plurality of entities may be one of a group consisting of an individual subscriber, a group of subscribers, and a combination thereof.
- 25 3. The method of claim 1 wherein the providing step comprises for each feature queue for the plurality of entities:
- a) creating the feature queue; and
 - b) defining the sequence to implement the call
30 features for the feature queue.
4. The method of claim 1 wherein the providing step comprises for each feature queue for the plurality of entities:

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- a) creating the feature queue; and
- b) defining the call features to include in the feature queue.

- 5 5. The method of claim 4 wherein the providing step comprises, for each feature queue for the plurality of entities, defining the sequence to implement the call features in the feature queue.
- 10 6. The method of claim 1 wherein each of the plurality of entities is associated with one telephony office and the providing step comprises:
- a) creating an office feature queue;
 - b) defining the sequence to implement call features
 - 15 for the office feature queue;
 - c) creating each feature queue for the plurality of entities; and
 - d) defining the sequence to implement the call
 - 20 features for each feature queue based on the entity.
7. The method of claim 6 further comprising modifying the office feature queue.
- 25 8. The method of claim 6 wherein the defining step comprises inheriting the sequence to implement call features for the office feature queue for the feature queues for each of the plurality of entities and modifying the sequence to implement call
- 30 features on a per-entity basis.
9. The method of claim 6 wherein the plurality of entities includes a group entity associated with a

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group of subscribers and a subscriber entity associated with a subscriber and:

- 5 a) the defining step for the group entity comprises inheriting the sequence to implement call features for the office feature queue and modifying the sequence to implement call features for the group entity for a group entity feature queue; and
- 10 b) the defining step for the subscriber entity comprises one of the following steps:
- 15 i) inheriting the sequence to implement call features for the office feature queue and modifying the sequence to implement call features for the subscriber entity for a subscriber entity feature queue; or
- 20 ii) inheriting the sequence to implement call features for the group entity feature queue and modifying the sequence to implement call features for the subscriber entity for the subscriber entity feature queue.

10. A method facilitating customized call processing comprising:

- 25 a) providing a standard feature queue for an office having a plurality of subscribers, the standard feature queue including call features associated with an event and defining a sequence to initiate the call features for call processing;
- 30 b) identifying a group of subscribers;
- c) creating a group feature queue for the group of subscribers, the group feature queue including call features associated with the event and defining the sequence to initiate the call

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- a) receiving instructions to modify one of the group feature queue and the subscriber feature queue; and
- b) modifying the one of the group feature queue and the subscriber feature queue based on the instructions.

15. A system facilitating customized call processing comprising:
- a) an interface to receive triggers for a call processing event occurring during a call; and
 - b) a control system associated with the interface and adapted to:
 - i) provide a feature queue for each of a plurality of entities, each feature queue including call features defining a sequence to initiate call features associated with an event for call processing;
 - ii) receive a trigger indicating an occurrence of the event for a call associated with one of the plurality of entities via the interface;
 - iii) identify the feature queue associated with the one of the plurality of entities corresponding to the event; and
 - iv) process the call to implement the call features in the sequence defined in the feature queue for the call.
16. The system of claim 15 wherein each of the plurality of entities may be one of a group consisting of an individual subscriber, a group of subscribers, and a combination thereof.
17. The system of claim 15 wherein the control system, for each feature queue for the plurality of entities, is further adapted to:
- a) create the feature queue; and

sequence to implement call features for the office feature queue for the feature queues for each of the plurality of entities and modifying the sequence to implement call features on a per-entity basis.

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23. The system of claim 20 wherein the plurality of entities includes a group entity associated with a group of subscribers and a subscriber entity associated with a subscriber and said control system is further adapted to:

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a) define the sequence to implement the call features for the group entity by inheriting the sequence to implement call features for the office feature queue and modifying the sequence to implement call features for the group entity for a group entity feature queue; and

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b) define the sequence to implement the call features for the subscriber entity by either:

i) inheriting the sequence to implement call features for the office feature queue and modifying the sequence to implement call features for the subscriber entity for a subscriber entity feature queue; or

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ii) inheriting the sequence to implement call features for the group entity feature queue and modifying the sequence to implement call features for the subscriber entity for the subscriber entity feature queue.

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24. A system for facilitating customized call processing comprising a control system adapted to:

a) provide a standard feature queue for an office having a plurality of subscribers, the standard

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feature queue including call features associated with an event and defining a sequence to initiate the call features for call processing;

- 5 b) identify a group of subscribers;
- c) create a group feature queue for the group of subscribers, the group feature queue including call features associated with the event and defining the sequence to initiate the call
- 10 features for call processing for the group of subscribers; and
- d) create a subscriber feature queue for a given subscriber in the plurality of subscribers, the subscriber feature queue including call
- 15 features associated with the event and defining the sequence to initiate the call features for call processing for the subscriber.

25. The system of claim 24 wherein said control system
- 20 is further adapted to:
- a) receive a trigger indicating an occurrence of the event for a call; and
- b) process the call to implement the call features in the sequence defined in an associated
- 25 feature queue for the call.

26. The system of claim 25 wherein the associated feature queue is the subscriber feature queue for the given subscriber, the group feature queue for a
- 30 subscriber in the group, and the default feature queue for a subscriber other than the given subscriber and not in the group.

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- 5 c) means for creating a group feature queue for the group of subscribers, the group feature queue including call features associated with the event and defining the sequence to initiate the call features for call processing for the group of subscribers; and
- 10 d) means for creating a subscriber feature queue for a given subscriber in the plurality of subscribers, the subscriber feature queue including call features associated with the event and defining the sequence to initiate the call features for call processing for the subscriber.
- 15 35. The system of claim 34 further comprising:
- a) means for receiving a trigger indicating an occurrence of the event for a call; and
- 20 b) means for processing the call to implement the call features in the sequence defined in an associated feature queue for the call.
36. The system of claim 35 wherein the associated feature queue is the subscriber feature queue for the given subscriber, the group feature queue for a subscriber in the group, and the default feature queue for a subscriber other than the given subscriber and not in the group.
- 25 37. A computer readable medium comprising software instructions for a computer to facilitate customized call processing by:
- 30 a) providing a feature queue for each of a plurality of entities, each feature queue defining a sequence to initiate the call

providing each feature queue for the plurality of entities by:

- a) creating an office feature queue;
- b) defining the sequence to implement call features for the office feature queue;
- c) creating each feature queue for each of the plurality of entities; and
- d) defining the sequence to implement the call features for each feature queue based on the entity.

42. The computer readable medium of claim 41 further comprising instructions for modifying the office feature queue.

43. The computer readable medium of claim 41 wherein the instructions for defining the sequence to implement the call features further comprise inheriting the sequence to implement call features for the office feature queue for the feature queues for each of the plurality of entities and modifying the sequence to implement call features on a per-entity basis.

44. The computer readable medium of claim 41 wherein the plurality of entities includes a group entity associated with a group of subscribers and a subscriber entity associated with a subscriber and the instructions for defining the sequence to implement the call features further comprise:

- a) for the group entity, inheriting the sequence to implement call features for the office feature queue and modifying the sequence to implement call features for the group entity for a group entity feature queue; and

b) for the subscriber entity, either:

i) inheriting the sequence to implement call features for the office feature queue and modifying the sequence to implement call features for the subscriber entity for a subscriber entity feature queue; or

ii) inheriting the sequence to implement call features for the group entity feature queue and modifying the sequence to implement call features for the subscriber entity for a subscriber entity feature queue.

45. A computer readable medium comprising software instructions for a computer to facilitate customized call processing by:

a) providing a standard feature queue for an office having a plurality of subscribers, the standard feature queue including call features associated with an event and defining a sequence to initiate the call features for call processing;

b) identifying a group of subscribers;

c) creating a group feature queue for the group of subscribers, the group feature queue including call features associated with the event and defining the sequence to initiate the call features for call processing for the group of subscribers; and

d) creating a subscriber feature queue for a given subscriber in the plurality of subscribers the subscriber feature queue including call features associated with the event and defining

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[illegible][illegible]

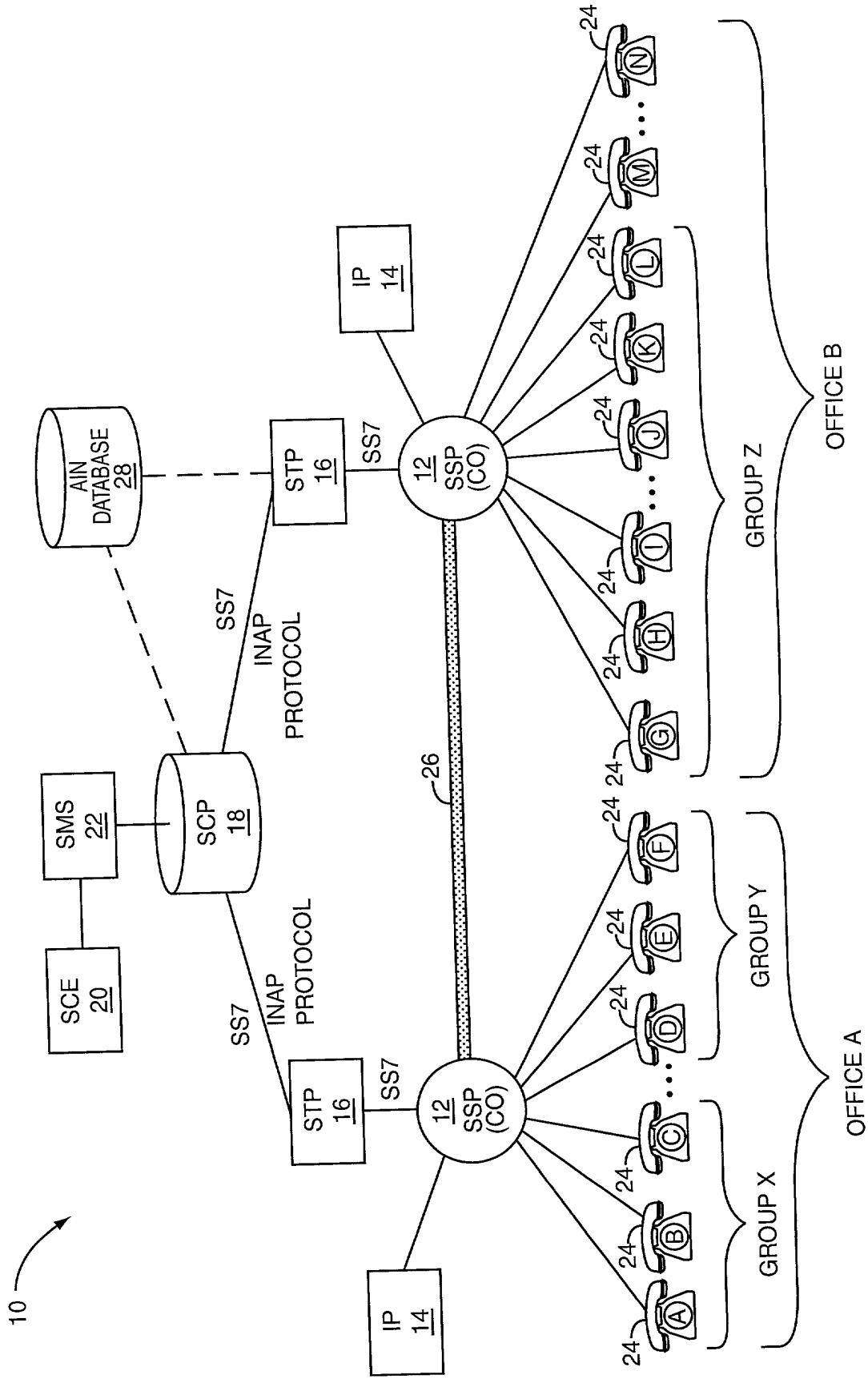


FIG. 1

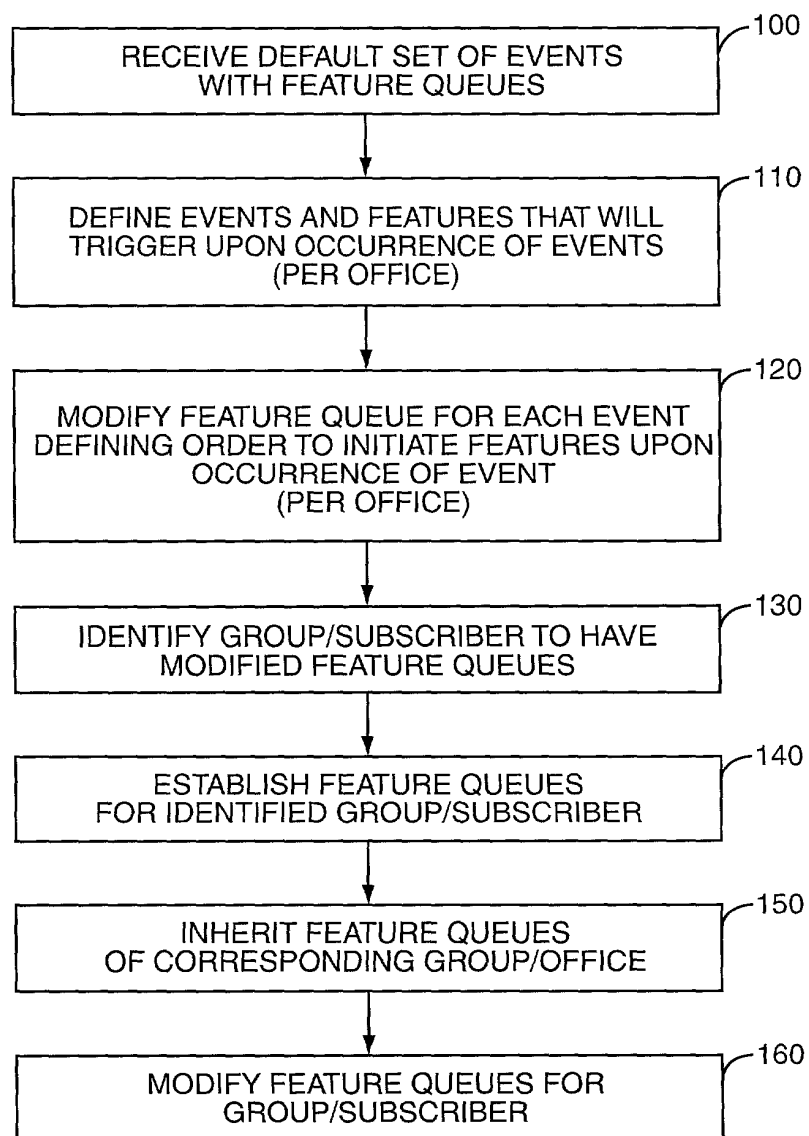


FIG. 2

CALL EVENT	OFFICE (DEFAULT)	OFFICE (MODIFIED)	GROUP WITHIN OFFICE	SUBSCRIBER WITHIN OFFICE OR GROUP
EVENT 1	FEATURE 1 FEATURE 2 FEATURE 3 FEATURE 4	FEATURE 2 FEATURE 1 FEATURE 3 NO PROVISIONING FOR FEATURE 4	FEATURE 3 FEATURE 2 FEATURE 1	FEATURE 1 FEATURE 2 FEATURE 3
EVENT 2	FEATURE 5 FEATURE 6 FEATURE 7 FEATURE 8 ⋮	FEATURE 5 FEATURE 6 FEATURE 7 FEATURE 8 ⋮	FEATURE 6 FEATURE 7 FEATURE 8 FEATURE 5 ⋮	FEATURE 7 FEATURE 6 FEATURE 5 FEATURE 8 ⋮
⋮	⋮	⋮	⋮	⋮

FIG. 3

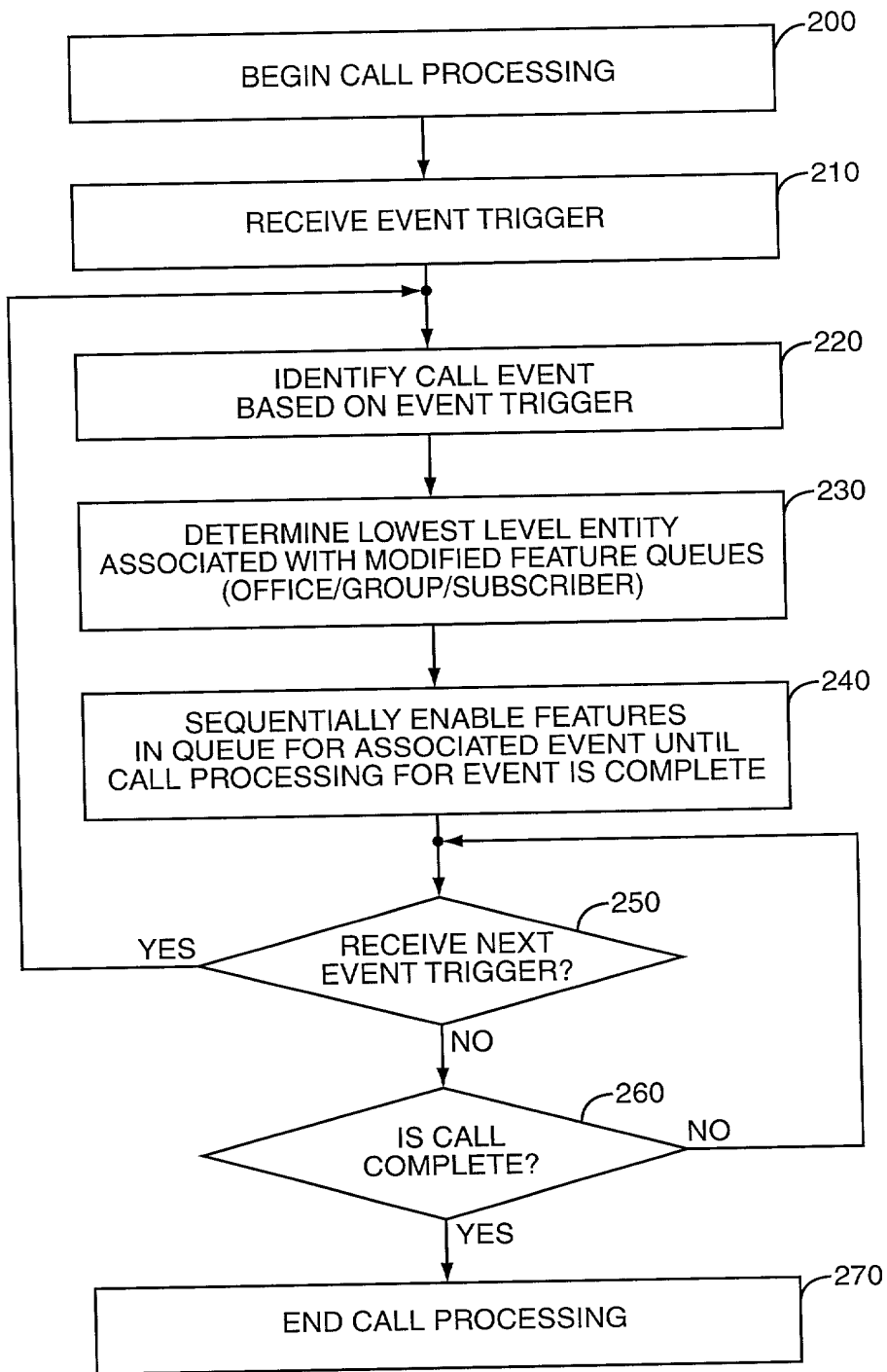


FIG. 4

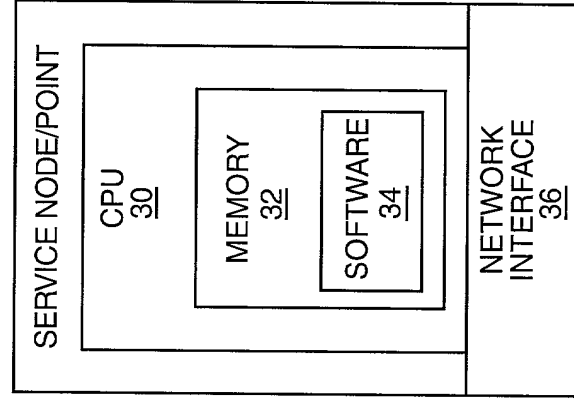


FIG. 5

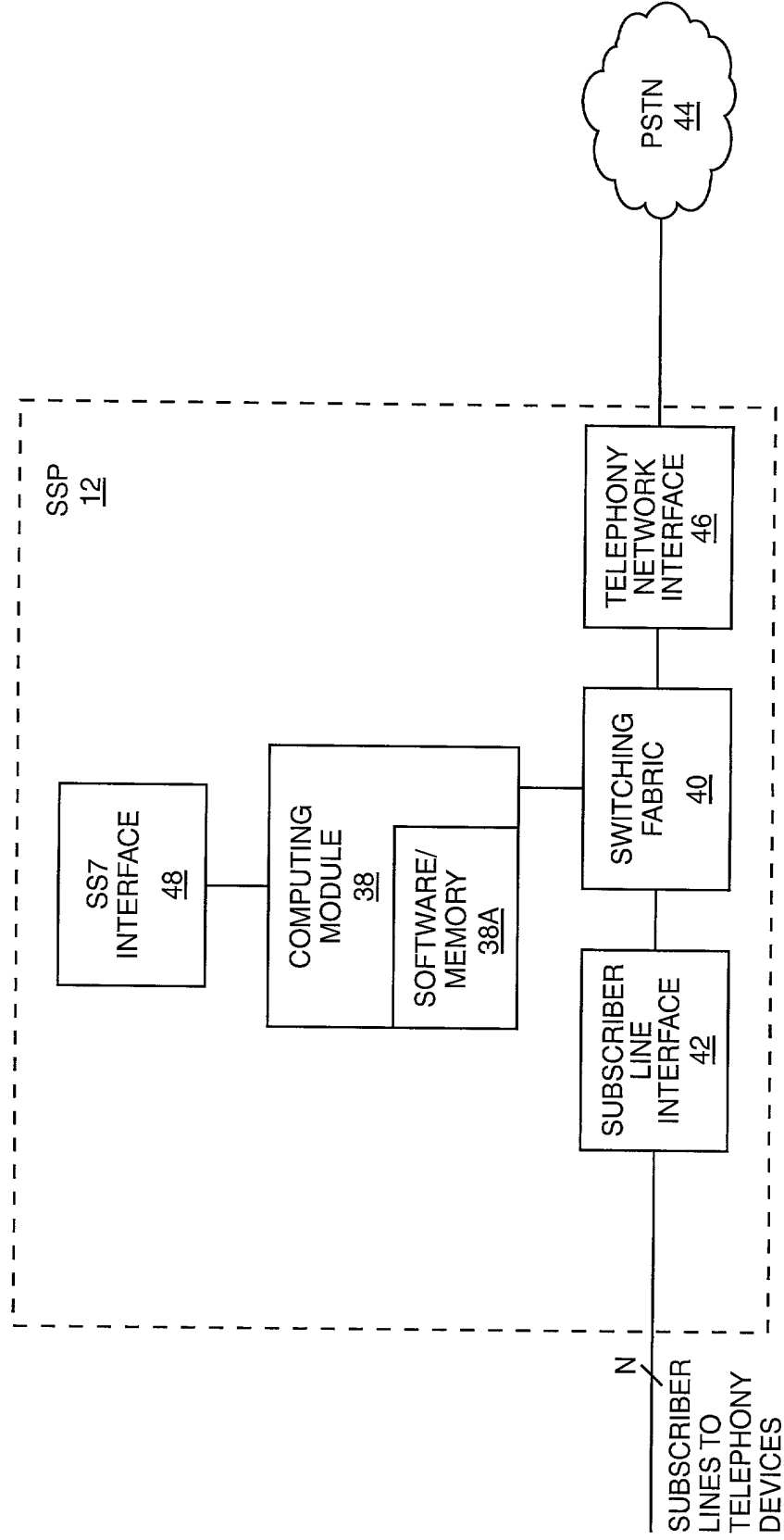


FIG. 6

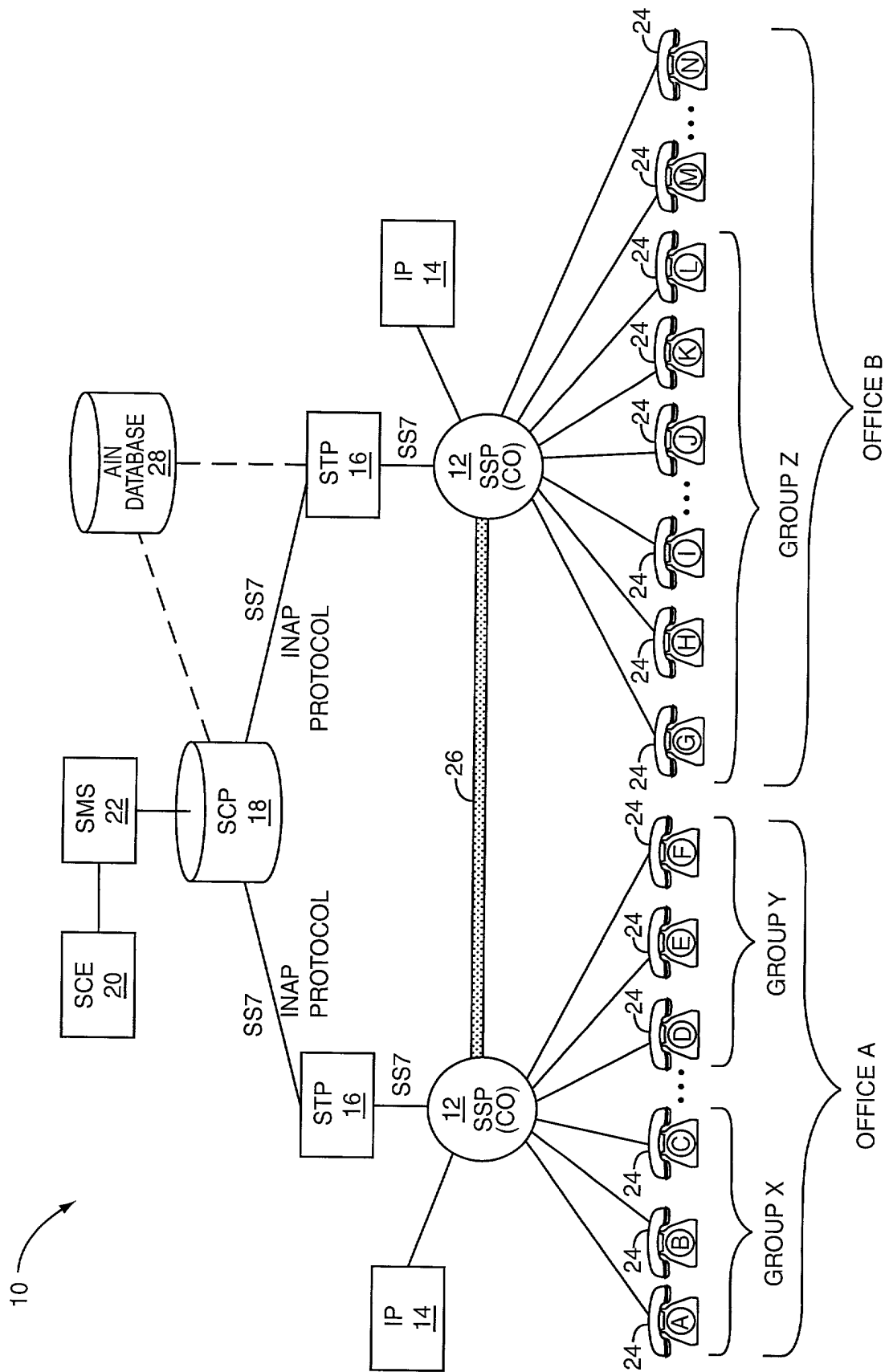


FIG. 1

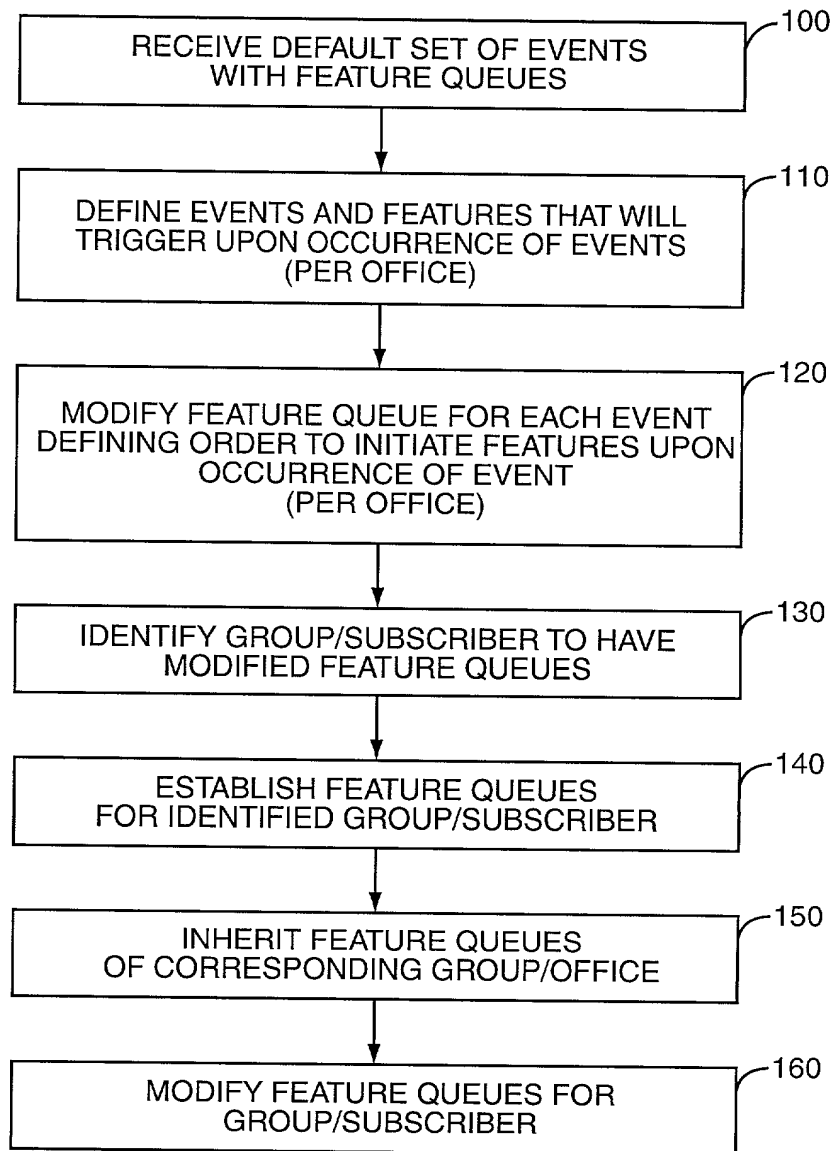


FIG. 2

CALL EVENT	OFFICE (DEFAULT)	OFFICE (MODIFIED)	GROUP WITHIN OFFICE	SUBSCRIBER WITHIN OFFICE OR GROUP
EVENT 1	FEATURE 1 FEATURE 2 FEATURE 3 FEATURE 4	FEATURE 2 FEATURE 1 FEATURE 3 NO PROVISIONING FOR FEATURE 4	FEATURE 3 FEATURE 2 FEATURE 1	FEATURE 1 FEATURE 2 FEATURE 3
EVENT 2	FEATURE 5 FEATURE 6 FEATURE 7 FEATURE 8	FEATURE 5 FEATURE 6 FEATURE 7 FEATURE 8	FEATURE 6 FEATURE 7 FEATURE 8 FEATURE 5	FEATURE 7 FEATURE 6 FEATURE 5 FEATURE 8
⋮	⋮	⋮	⋮	⋮

FIG. 3

```

graph TD
    200[BEGIN CALL PROCESSING] --> 210[RECEIVE EVENT TRIGGER]
    210 --> 220[IDENTIFY CALL EVENT  
BASED ON EVENT TRIGGER]
    220 --> 230[DETERMINE LOWEST LEVEL ENTITY  
ASSOCIATED WITH MODIFIED FEATURE QUEUES  
(OFFICE/GROUP/SUBSCRIBER)]
    230 --> 240[SEQUENTIALLY ENABLE FEATURES  
IN QUEUE FOR ASSOCIATED EVENT UNTIL  
CALL PROCESSING FOR EVENT IS COMPLETE]
    240 --> 250{RECEIVE NEXT  
EVENT TRIGGER?}
    250 -- YES --> 220
    250 -- NO --> 260{IS CALL  
COMPLETE?}
    260 -- YES --> 270[END CALL PROCESSING]
    260 -- NO --> 240
  
```

FIG. 4

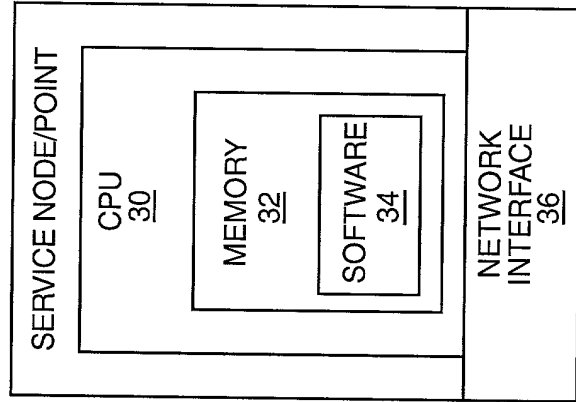


FIG. 5

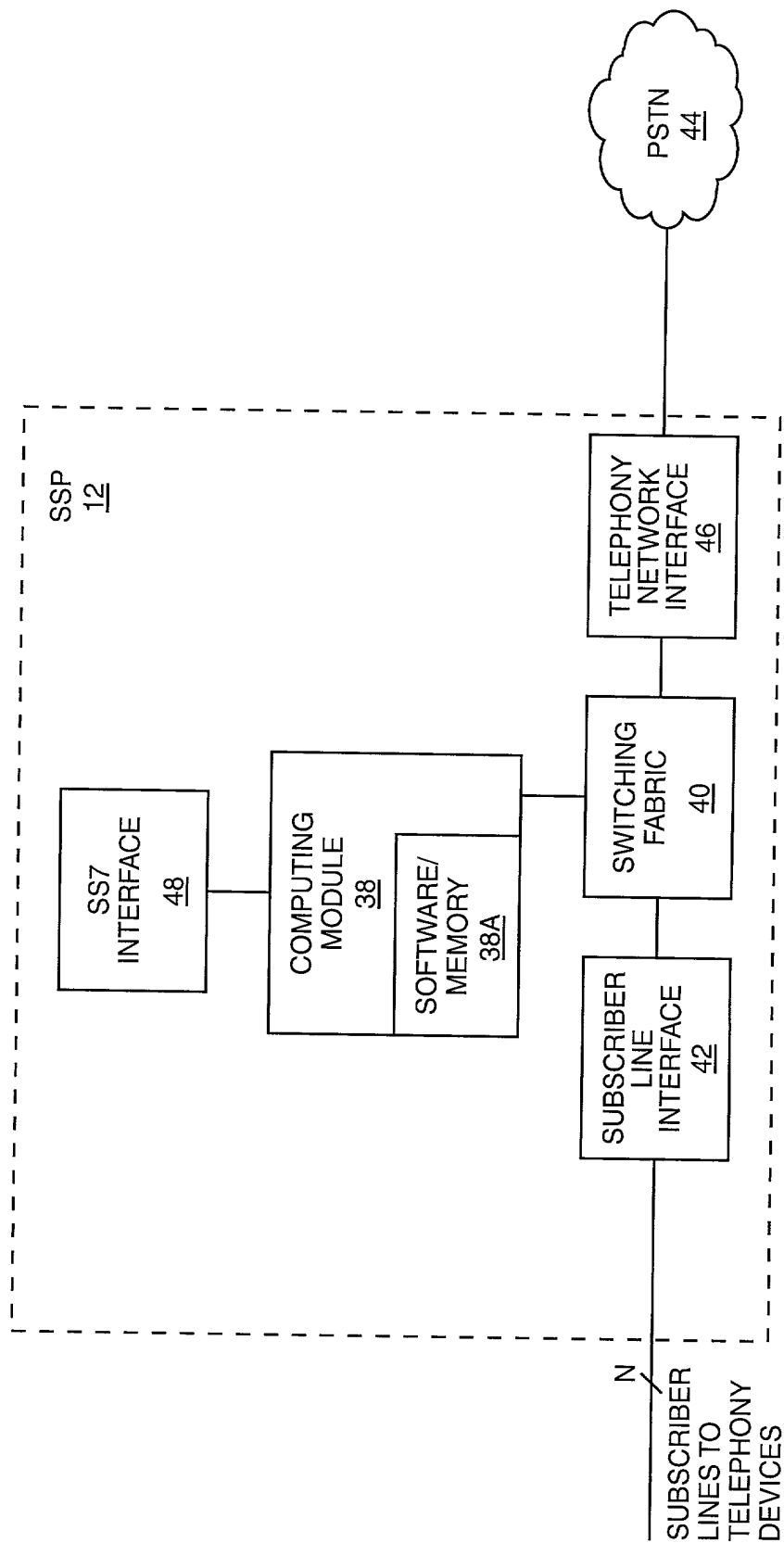


FIG. 6

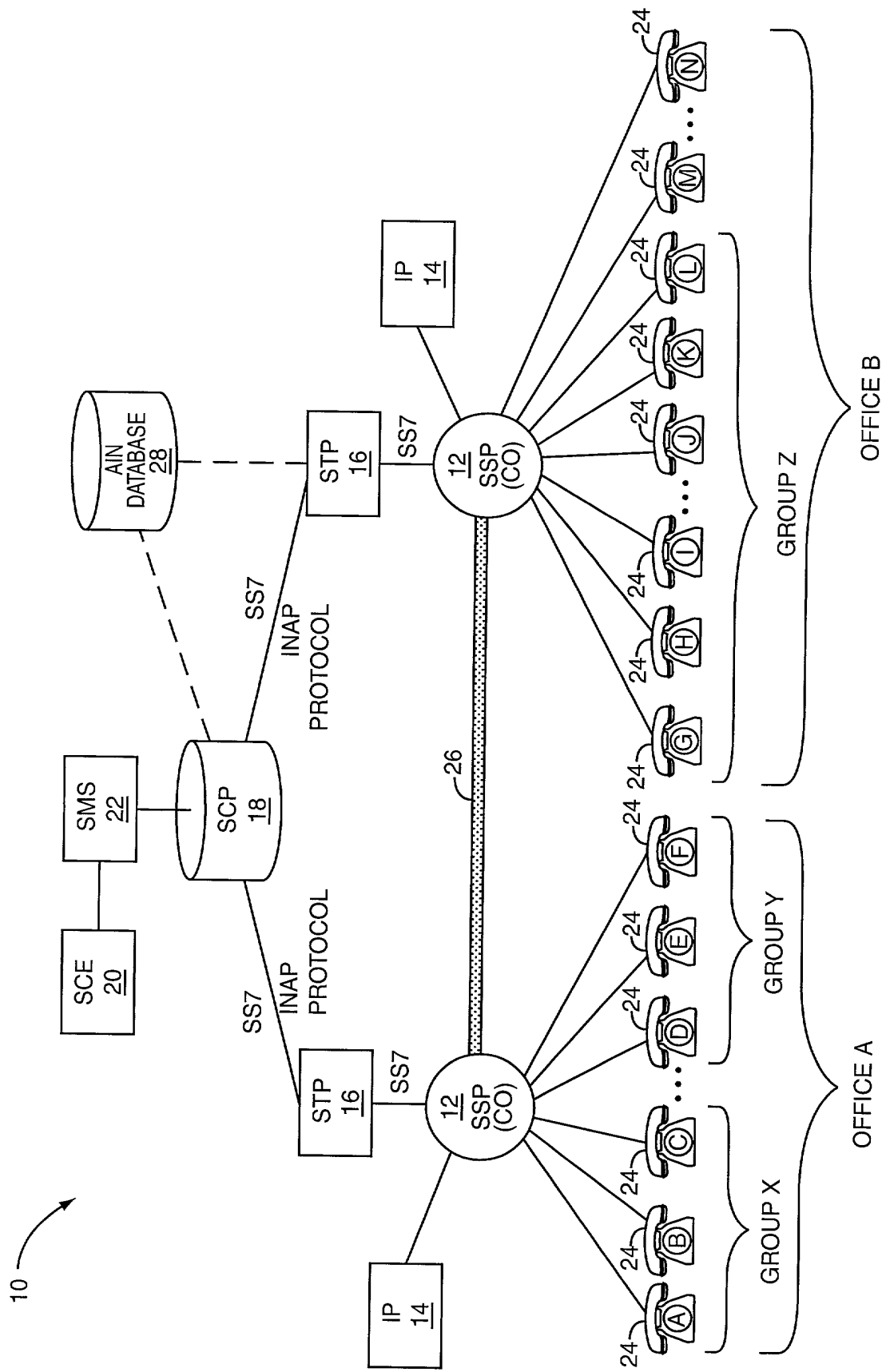


FIG. 1

```
graph TD; 100[RECEIVE DEFAULT SET OF EVENTS WITH FEATURE QUEUES] --> 110[DEFINE EVENTS AND FEATURES THAT WILL TRIGGER UPON OCCURRENCE OF EVENTS (PER OFFICE)]; 110 --> 120[MODIFY FEATURE QUEUE FOR EACH EVENT DEFINING ORDER TO INITIATE FEATURES UPON OCCURRENCE OF EVENT (PER OFFICE)]; 120 --> 130[IDENTIFY GROUP/SUBSCRIBER TO HAVE MODIFIED FEATURE QUEUES]; 130 --> 140[ESTABLISH FEATURE QUEUES FOR IDENTIFIED GROUP/SUBSCRIBER]; 140 --> 150[INHERIT FEATURE QUEUES OF CORRESPONDING GROUP/OFFICE]; 150 --> 160[MODIFY FEATURE QUEUES FOR GROUP/SUBSCRIBER];
```

100 RECEIVE DEFAULT SET OF EVENTS WITH FEATURE QUEUES

110 DEFINE EVENTS AND FEATURES THAT WILL TRIGGER UPON OCCURRENCE OF EVENTS (PER OFFICE)

120 MODIFY FEATURE QUEUE FOR EACH EVENT DEFINING ORDER TO INITIATE FEATURES UPON OCCURRENCE OF EVENT (PER OFFICE)

130 IDENTIFY GROUP/SUBSCRIBER TO HAVE MODIFIED FEATURE QUEUES

140 ESTABLISH FEATURE QUEUES FOR IDENTIFIED GROUP/SUBSCRIBER

150 INHERIT FEATURE QUEUES OF CORRESPONDING GROUP/OFFICE

160 MODIFY FEATURE QUEUES FOR GROUP/SUBSCRIBER

FIG. 2

CALL EVENT	OFFICE (DEFAULT)	OFFICE (MODIFIED)	GROUP WITHIN OFFICE	SUBSCRIBER WITHIN OFFICE OR GROUP
EVENT 1	FEATURE 1 FEATURE 2 FEATURE 3 FEATURE 4	FEATURE 2 FEATURE 1 FEATURE 3 NO PROVISIONING FOR FEATURE 4	FEATURE 3 FEATURE 2 FEATURE 1	FEATURE 1 FEATURE 2 FEATURE 3
EVENT 2	FEATURE 5 FEATURE 6 FEATURE 7 FEATURE 8	FEATURE 5 FEATURE 6 FEATURE 7 FEATURE 8	FEATURE 6 FEATURE 7 FEATURE 8 FEATURE 5	FEATURE 7 FEATURE 6 FEATURE 5 FEATURE 8
⋮	⋮	⋮	⋮	⋮

FIG. 3

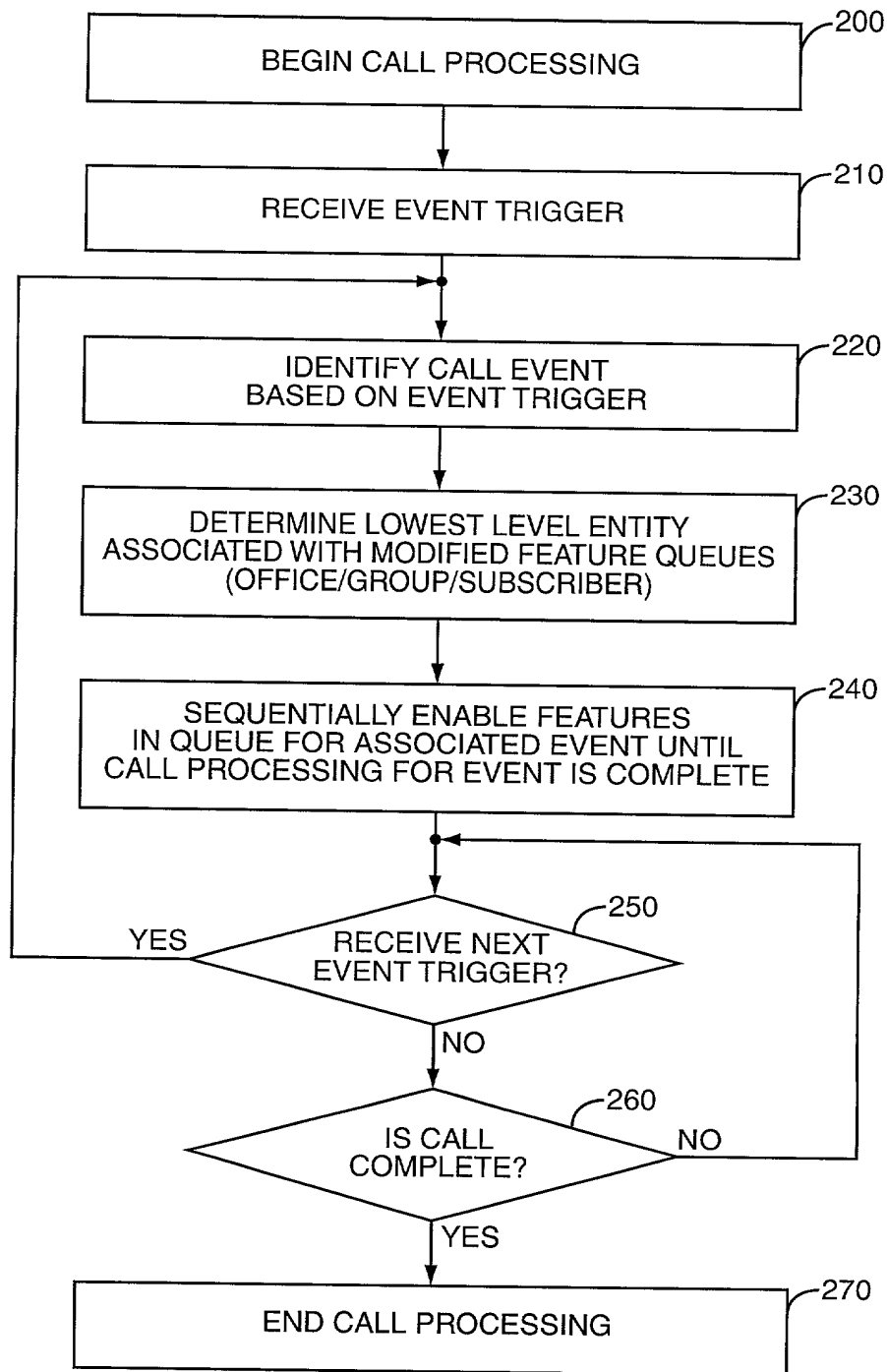


FIG. 4

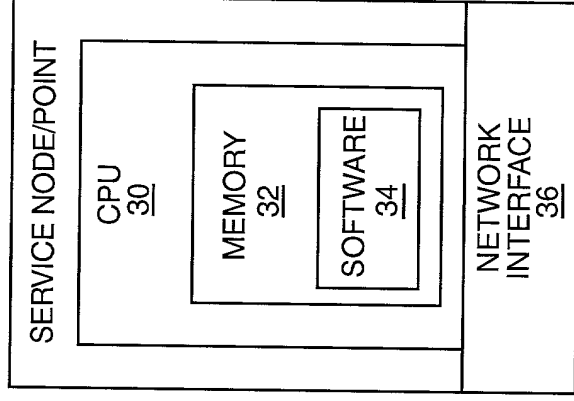


FIG. 5

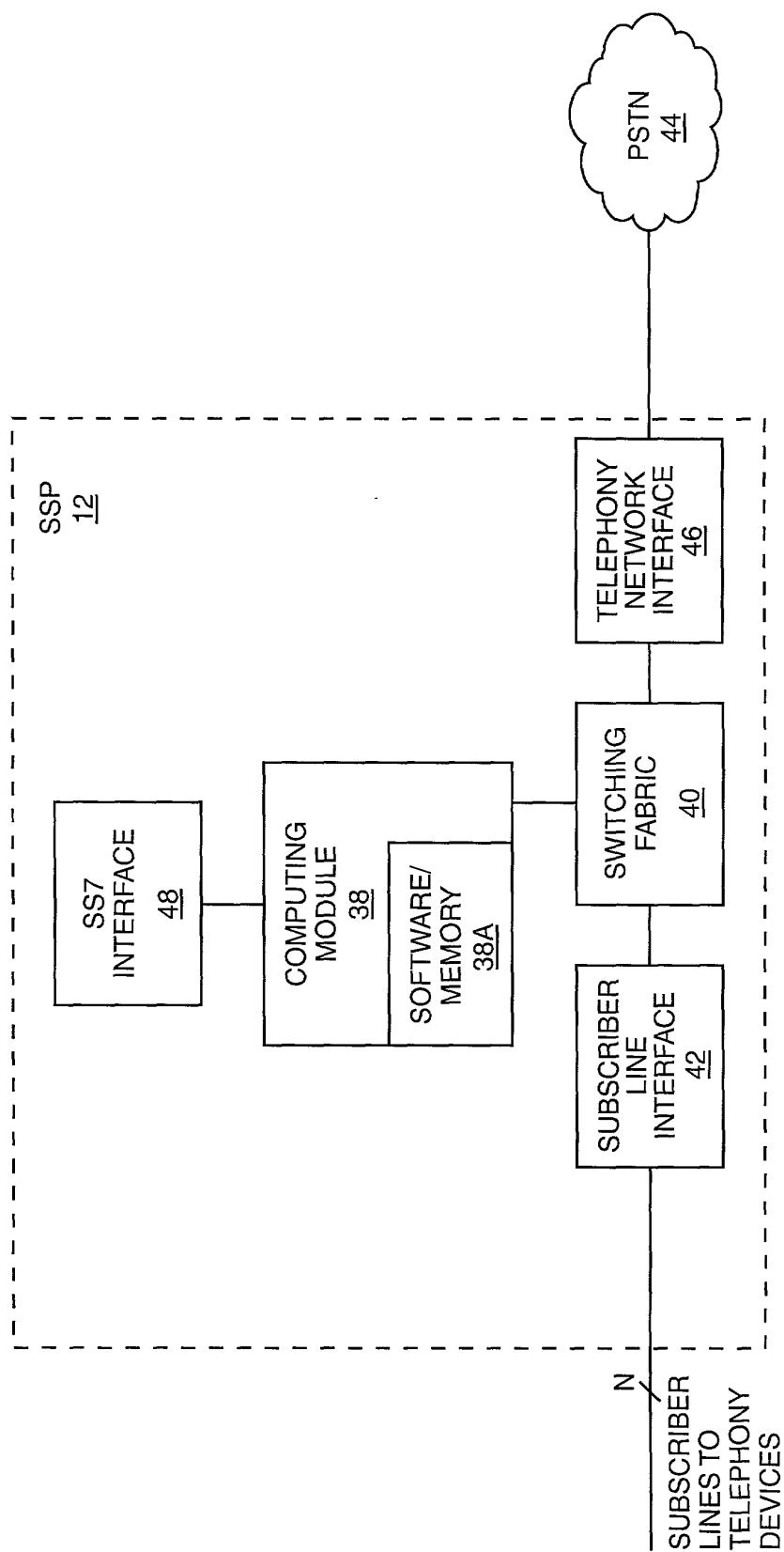


FIG. 6

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DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)	Attorney Docket Number	7000-043
	First Named Inventor	Wood, Patrick S.
	COMPLETE IF KNOWN	
	Application Number	/
<input checked="" type="checkbox"/> Declaration Submitted with Initial Filing OR <input type="checkbox"/> Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16 (e)) required)	Filing Date	
	Group Art Unit	
	Examiner Name	

As a below named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

PROGRAMMABLE FEATURE QUEUES

(Title of the Invention)

the specification of which



is attached hereto

OR



was filed on (MM/DD/YYYY) as United States Application Number or PCT International

Application Number and was amended on (MM/DD/YYYY) (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached?	
				YES	NO
				<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>

☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto:

I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below

Application Number(s)	Filing Date (MM/DD/YYYY)	<input type="checkbox"/> Additional provisional application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

[Page 1 of 2]

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DECLARATION — Utility or Design Patent Application

I hereby claim the benefit under 35 U.S.C. 120 of any United States application(s), or 365(c) of any PCT international application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application

U.S. Parent Application or PCT Parent Number	Parent Filing Date (MM/DD/YYYY)	Parent Patent Number (if applicable)

☐ Additional U.S. or PCT international application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

As a named inventor, I hereby appoint the following registered practitioner(s) to prosecute this application and to transact all business in the Patent

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Name	Registration Number	Name	Registration Number

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24631

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Name of Sole or First Inventor: ☐ A petition has been filed for this unsigned inventor

Given Name (first and middle [if any])

Family Name or Surname

Patrick S.

Wood

Inventor's Signature		Date	Nov. 28 '00				
Residence: City	Raleigh	State	NC	Country	USA	Citizenship	USA
Post Office Address	8500 Kempton Road						
Post Office Address							
City	Raleigh	State	NC	ZIP	27615	Country	USA

☐ Additional inventors are being named on the supplemental Additional Inventor(s) sheet(s) PTO/SB/02A attached hereto.